In [3]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

%matplotlib inline
```

In [5]:
```
df=pd.read_csv('housing.csv')
df
```

Out[5]:

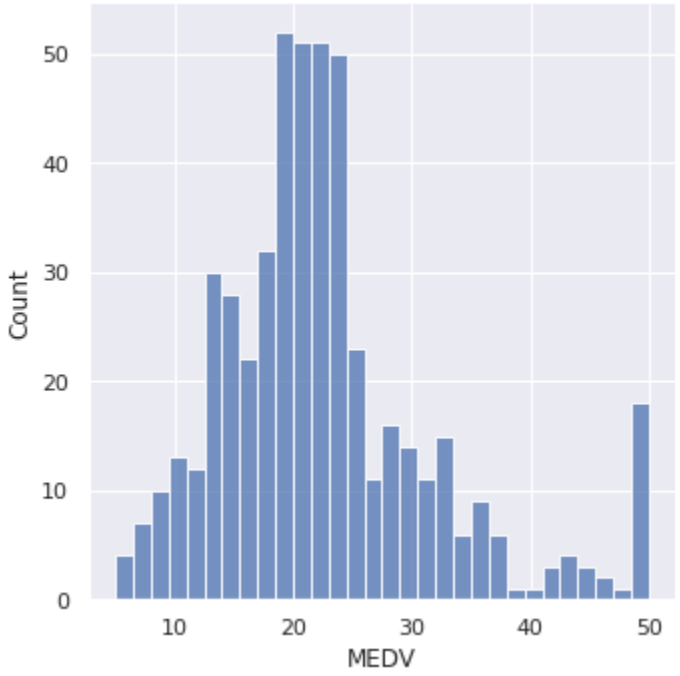
	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	DIS	RAD	TAX	PTRATIO	B	LSTAT	MEDV
0	0.00632	18.0	2.31	0	0.538	6.575	65.2	4.0900	1	296	15.3	396.90	4.98	24.0
1	0.02731	0.0	7.07	0	0.469	6.421	78.9	4.9671	2	242	17.8	396.90	9.14	21.6
2	0.02729	0.0	7.07	0	0.469	7.185	61.1	4.9671	2	242	17.8	392.83	4.03	34.7
3	0.03237	0.0	2.18	0	0.458	6.998	45.8	6.0622	3	222	18.7	394.63	2.94	33.4
4	0.06905	0.0	2.18	0	0.458	7.147	54.2	6.0622	3	222	18.7	396.90	5.33	36.2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
501	0.06263	0.0	11.93	0	0.573	6.593	69.1	2.4786	1	273	21.0	391.99	9.67	22.4
502	0.04527	0.0	11.93	0	0.573	6.120	76.7	2.2875	1	273	21.0	396.90	9.08	20.6
503	0.06076	0.0	11.93	0	0.573	6.976	91.0	2.1675	1	273	21.0	396.90	5.64	23.9
504	0.10959	0.0	11.93	0	0.573	6.794	89.3	2.3889	1	273	21.0	393.45	6.48	22.0
505	0.04741	0.0	11.93	0	0.573	6.030	80.8	2.5050	1	273	21.0	396.90	7.88	11.9

506 rows × 14 columns

In [6]:
```
print(df.keys())
```

```
Index(['CRIM', 'ZN', 'INDUS', 'CHAS', 'NOX', 'RM', 'AGE', 'DIS', 'RAD', 'TAX',
       'PTRATIO', 'B', 'LSTAT', 'MEDV'],
      dtype='object')
```

In [9]:
```
sns.set(rc={'figure.figsize':(11.7,8.27)})
sns.displot(df['MEDV'],bins=30)
plt.show()
```

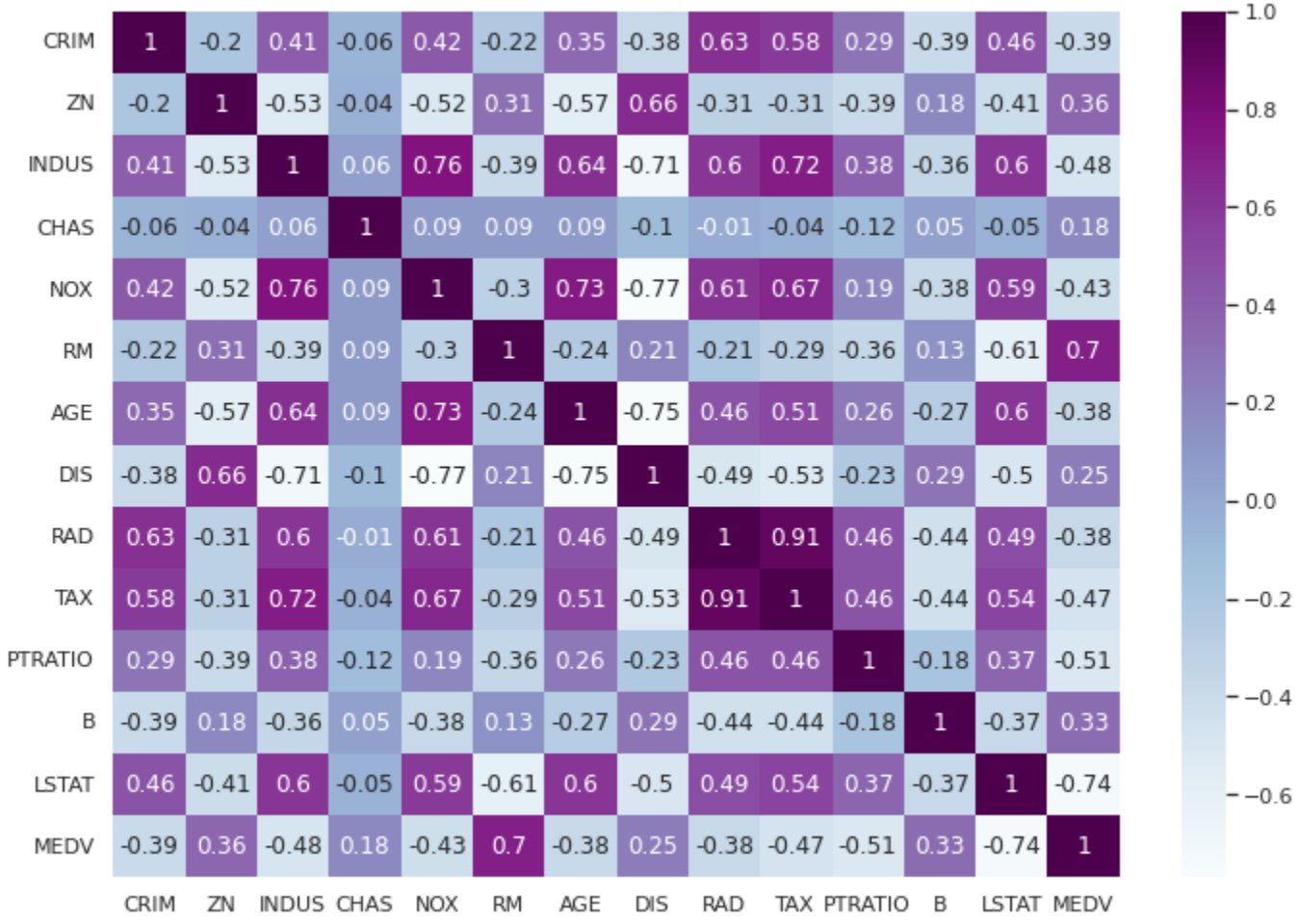


In [10]:

```
correlation_matrix=df.corr().round(2)
sns.heatmap(data=correlation_matrix,annot=True, cmap='BuPu')
```

Out[10]:

```
<Axes: >
```

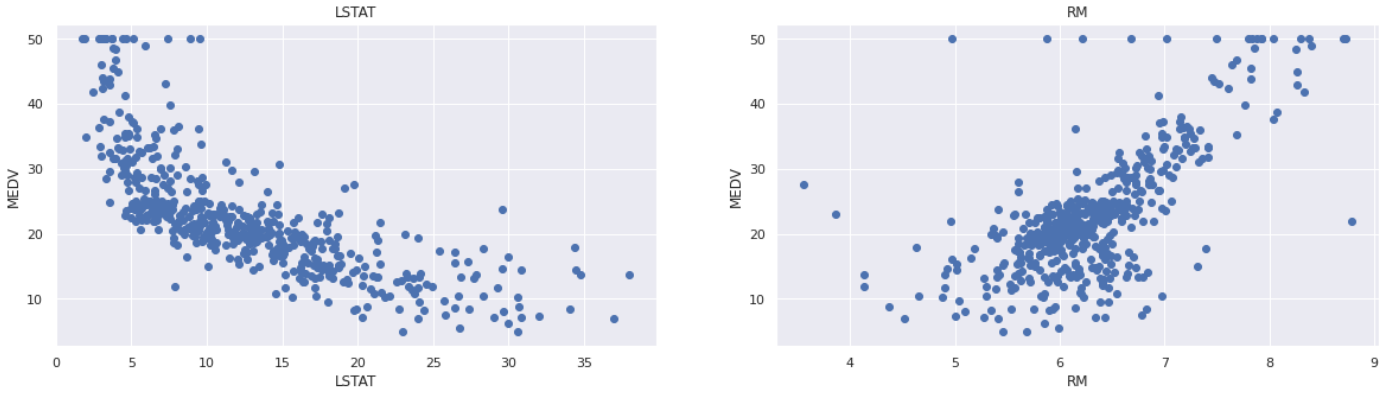


In [11]:

```
plt.figure(figsize=(20,5))

features=['LSTAT','RM']
target=df['MEDV']
```

```
for i, col in enumerate(features):
    plt.subplot(1,len(features),i+1)
    x=df[col]
    y=target
    plt.scatter(x,y,marker='o')
    plt.title(col)
    plt.xlabel(col)
    plt.ylabel('MEDV')
```



In [13]:
```
X=pd.DataFrame(np.c_[df['LSTAT'],df['RM']], columns=['LSTAT','RM'])
Y=df['MEDV']
```

In [15]:
```
from sklearn.model_selection import train_test_split

# splitting the data into training and testing data
X_train, X_test, Y_train, Y_test=train_test_split(X,Y,test_size=0.2,random_state=5)
print(X_train.shape)
print(X_test.shape)
print(Y_train.shape)
print(Y_test.shape)
```

```
(404, 2)
(102, 2)
(404,)
(102,)
```

In [16]:
```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error

# creating a linear regression model
lin_model=LinearRegression()

# fit the model using the training data
lin_model.fit(X_train,Y_train)
```

Out[16]:
```
▼ LinearRegression
LinearRegression()
```

In [18]:
```
# y_train_predict=lin_model.predict(X_train)
# rmse=(np.sqrt(mean_squared_error(Y_train,y_train_predict)))
# r2=r2_score(Y_train,y_train_predict)

# print("the model performance for training set")
# print("--------------------------------------")
# print('RMSE is {}'.format(rmse))
```

```
# print('R2 score is {}'.format(r2))
# print("\n")

# y_test_predict=lin_model.predict(X_test)
# rmse=(np.sqrt(mean_squared_error(Y_test,y_test_predict)))
# r2=re_score(Y_test,y_test_predict)

# print("The model performance for testing set")
# print('--------------------------------------')
# print("RMSE is {}".format(rmse))
# print("R2 score is {}".format(r2))
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_5318/2122781312.py in <module>
      1 y_train_predict=lin_model.predict(X_train)
      2 rmse=(np.sqrt(mean_squared_error(Y_train,y_train_predict)))
----> 3 r2=r2_score(Y_train,y_train_predict)
      4
      5 print("the model performance for training set")

NameError: name 'r2_score' is not defined
```

In [22]:

```
# predict the target values for the test data
y_pred=lin_model.predict(X_train)
```

In [23]:

```
# predicting through scatter
plt.scatter(Y_train,y_pred)
plt.xlabel("Prices")
plt.ylabel("predicted prices")
plt.title("prices vs preicted prices")
plt.show()
```

In [25]:
```
# calculate the mean squared error and root mean squared values

from sklearn.metrics import mean_squared_error
mse = mean_squared_error(Y_train,y_pred)
mse
```

Out[25]:
```
31.77722714032021
```

In [26]:
```
root_mse=mse**(1/2)
root_mse
```

Out[26]:
```
5.637129335071195
```

In [27]:
```
root_mse
```

Out[27]:
```
5.637129335071195
```

In [ ]: